DOCUMENT RESUME

ED 328 521 SP 032 830

TITLE Classroom Instructional Design: Options for Teacher/Student Interaction.
INSTITUTION Minnesota State Dept. of Education, St. Paul.
PUB DATE Aug 89
NOTE 79p.
AVAILABLE FROM Minnesota Curriculum Services Center, 3554 White Bear Ave., White Bear Lake, MN 55110.
PUB TYPE Guides - Classroom Use - Guides (For Teachers) (052)

EDRS PRICE MF01/PC04 Plus Postage.
DESCRIPTORS *Cognitive Style; Elementary Secondary Education; *Instructional Design; *Instructional Improvement; Interaction; Learning Processes; Learning Strategies; *Teacher Role; *Teacher Student Relationship; Teaching Methods; *Teaching Styles

ABSTRACT

This publication was developed to help teachers expand their choices for teacher-student instructional interaction. It identifies the key issues in the design of instruction and develops a common vocabulary surrounding instructional improvement. The role of the teacher as decision maker is emphasized. A description is given of the four interacting components of the instructional process: the learner, the teacher, teacher-designed instructional events, and educational expectations, and of the four critical elements of instructional design: assessment, planning, implementation, and evaluation. Three models of teaching are defined: (1) the directive--in which the teacher strives to assure a mastery of predetermined objectives to meet educational expectations; (2) the investigative--in which the teacher establishes broad-based objectives and provides choices for the learner to explore; and (3) the interactive--in which the teacher focuses on the needs, interests, and preferences of learners. These models describe the teacher's actions during the implementation phase of instruction and the student's responses to the instruction. (JD)

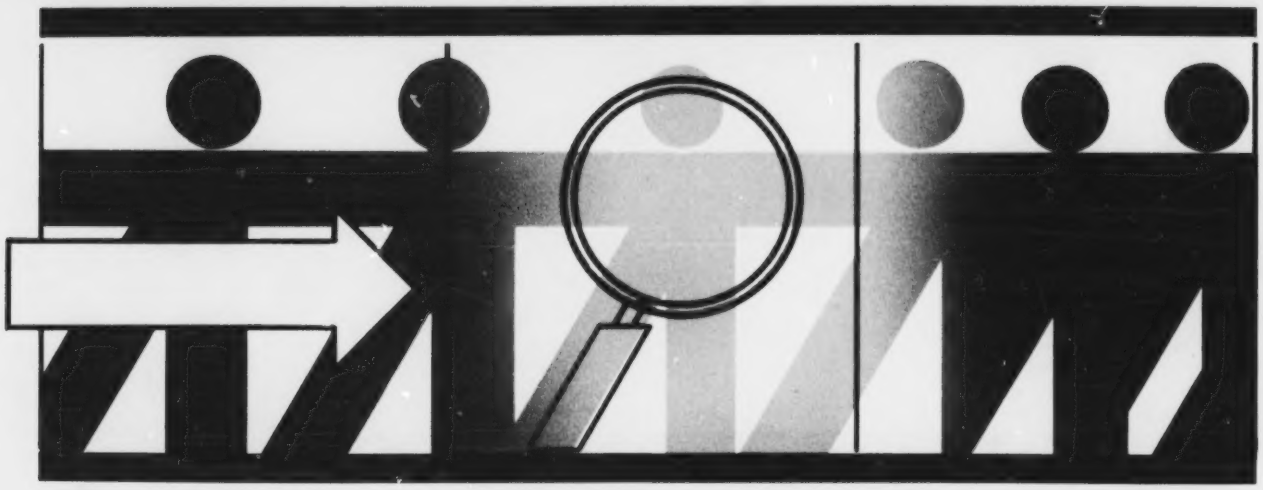
****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

SP

ED328521

CLASSROOM INSTRUCTIONAL DESIGN

OPTIONS FOR TEACHER/STUDENT INTERACTION



CLASSROOM DECISION MAKING

STATE OF MINNESOTA • DEPARTMENT OF EDUCATION

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

R. Weinberg

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

BEST COPY AVAILABLE

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☐ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

SP 032 830

This publication is available from: The Minnesota Curriculum Services Center which is supported by the Minnesota Department of Education. The MCSC does not discriminate on the basis of race, color, creed, religion, sex, national origin, marital status, status with regard to public assistance or disability.

Minnesota Curriculum Services Center
3554 White Bear Avenue
White Bear Lake, MN 55110
612/770-3943 • 1-800-652-9024

E1418

2571
889300

CLASSROOM INSTRUCTIONAL DESIGN

August 1989

Minnesota Department of Education
Instructional Design Section

©1989 Minnesota Department of Education

Permission is granted to Minnesota school districts to duplicate this document for nonprofit, educational use. All others require written permission from the Minnesota Department of Education. Inquiries should be referenced to: Gilbert Valdez, Ph.D., Manager of Instructional Design, 684 Capitol Square Building, 550 Cedar Street, St. Paul, MN 55101.

STATE OF MINNESOTA
DEPARTMENT OF EDUCATION

Mary Lillesve, Educational Effectiveness Specialist

Dr. Corinna Moncada, Early Childhood Specialist

Sarah Smith, Gifted Education Specialist

Dr. Ruth E. Randall	Commissioner of Education
Dr. James E. Sauter	Assistant Commissioner
Dr. Gilbert Valdez	Manager, Instructional Design Section

TABLE OF CONTENTS

INTRODUCTION xi

THE LEARNER xiii

COMPONENTS OF THE INSTRUCTIONAL PROCESS 1

THE LEARNER 2

Capabilities 2
Preferences 3
Experiences 3

THE TEACHER 4

TEACHER-DESIGNED INSTRUCTIONAL EVENTS 4

EDUCATIONAL EXPECTATIONS 4

THE DESIGN PROCESS 8

Assessment 8
Planning 9
Implementation 10
Evaluation 11

THREE MODELS OF TEACHING: COMPARISONS AND CONTRASTS 13

DIRECTIVE MODEL 16
Orientation to the Model 16
Underlying Theory 16

THE DIRECTIVE DESIGN PROCESS 19
Assessment 19
Planning 19
Implementation 20
Introduction 23
Instruction 25
Practice 27
Monitoring and Adjustment 28
Facilitating Closure 28
Evaluation 29

INVESTIGATIVE MODEL 30
Orientation to the Model 30
Underlying Theory 30

INVESTIGATIVE DESIGN PROCESS 32
Assessment 32
Planning 32
Implementation 32
Introduction 35
Instruction 36
Providing Choices 37
Monitoring/Interaction/Communication 38
Evaluation 40
Facilitating Closure 40

INTERACTIVE MODEL 42
Orientation to the Model 42
Underlying Theory 43

THE INTERACTIVE DESIGN PROCESS 46
Assessment 46
Planning 46
Implementation 47
Introduction 50
Interaction and Communication 51
Instruction 52
Evaluation 53
Facilitating Closure 54

SUPPORT STRUCTURES 55

BOARD AND DISTRICT SUPPORT 56

BUILDING SUPPORT 56
Principal 56
Instructional Teams 57
Professionals in Student Services 57

SUMMARY 60

APPENDIX 62

REFERENCES 65
Directive Model 65
Investigative Model 66
Interactive Model 68

FIGURES

FIGURE		
1	Critical Attributes of Three Models of Instruction	Page 15
2	The Flow of Instruction Using the Directive Model	Page 22
3	The Flow of Instruction Using the Investigative Model	Page 34
4	The Flow of Instruction Using the Interactive Model	Page 49

ACKNOWLEDGEMENTS

Classroom Instructional Design *was developed by the following Minnesota educators. Their contributions, based on extensive experience in instructional design, are gratefully acknowledged.*

AUTHORS

Mary Lillesve	Minnesota Department of Education
Corinna Moncada	Minnesota Department of Education
Sarah Smith	Minnesota Department of Education
Gilbert Valdez	Minnesota Department of Education

CONTRIBUTING AUTHORS

Cathy Gallagher-Green	Consultant, Eden Prairie Minnesota
Gail Roberts	St. Paul Early Childhood Family Education
Ken Rood	Eden Prairie Public Schools

REVIEW COMMITTEE

Leila Anderson	Bloomington Public Schools
Denis Aitkinson	South Washington County Schools
Tom Bell	St. Paul Park Public Schools
Michelle Benson	Duluth Public Schools
Georgia Bulson	St. Paul Public Schools
Wendell Carroll	St. Paul Open School
Nick Demuth	Cold Spring-Riccori Public Schools
Loren Dunham	Fairmont High School
Mary Ann Fabel	Barton Open School-Minneapolis
Karen Holicky	Minneapolis Public Schools
Ron Jandura	St. Cloud Public Schools
Ken Kelsey	St. Cloud State University
Harold Larson	West Central ECSU
Dwight Lindbloom	Edina Public Schools
Robert Melin	Mantorville Elementary School
Patricia Mohn	Amboy-Good Thunder Public Schools
Ed Nelson	Crookston Public Schools
David Ollanketo	Anoka-Hennepin Public Schools
Elizabeth Pawlitschek	Plymouth Junior High School
Rose Redmond	Webster Open School-Minneapolis
Monica Sargent	Virginia Public Schools
James Sauter	Minnesota Department of Education
Barbara Smigala	St. Louis Park Schools
Andy Urban	St. Paul Highland Junior High School
Elaine Vezina	Burnsville Sioux Trail Public School
Joan Wallin	Minnesota Department of Education
Mary Jo Weingarten	Stillwater Public Schools
Pat Welter	St. Cloud Public Schools
Gene Young	Chippewa Junior High School

INTRODUCTION

Classroom Intructional Design was developed by the Instructional Design Section of the Minnesota Department of Education to promote student learning by helping teachers expand their choices for teacher-student instructional interaction. It identifies the key issues in the design of instruction and develops a common vocabulary surrounding instructional improvement. The role of the teacher as a professional decision maker in an instructional setting is emphasized.

In the development stages of this publication, the authors operated under the premise that the more instructional choices a teacher has, the more probable it is that students will learn. The successful teacher is able to use the various models which are most appropriate to particular learners, settings, times and conditions.

Instruction develops the capabilities, preferences and experiences of the learner through designed instructional events. The material contained herein is designed to stimulate discussion about instructional decision making and instructional design. **Classroom Instructional Design** describes three approaches or models of interaction between teachers and learners:

1. The Directive Model
2. The Investigative Model
3. The Interactive Model

Many other models could have been included, but, due to space limitations, were not.

Classroom Instructional Design was developed to support the Instructional Process component of the Department's **Coordinated Model for Educational Improvement** series. The other publications in this series include:

PER Process This publication suggests procedures for involving citizens and professional educators in the entire curriculum development process.

Goal and Outcome Specification Process A booklet describing the PER process which allows stakeholders an opportunity for involvement in the determination of the content of instruction.

Personalized Learning Process and Personalized Learning Plan A publication which suggests procedures for teachers to identify student aspirations and unique learner needs.

Assessment and Feedback Process A publication which suggests procedures for assessing student performance, determining student special needs, and disseminating that information on a timely basis to students and teachers.

Instructional Process A booklet describing a global view of instruction in the context of the developing capabilities, preferences and experiences of the learner.

Other district-level support for effective instruction is described in the following publications: **The Management Process, Staff Development** and **Partnership Process**. All these publications are available through the Minnesota Curriculum Services Center (see address on inside cover).

THE LEARNER

At the heart of instruction is the learner, a complex person made up of developing capabilities, preferences and experiences. Learning occurs in a variety of formal and informal settings. A primary purpose of education for the learner is to experience real-world learning events in an organized way and to maximize the individual's ability to integrate and adapt to an ever-changing environment.

As children grow to adulthood, there are common patterns of growth and development. Within these common patterns, however, wide variations in development are normal in the formative years for individuals and for groups. Instructional events are planned for a common pattern of growth and development but are modified or extended to provide for variation in capacities.

The major goal of education is to promote learning. Learning is a process, or set of processes, which results in increased knowledge and skills and/or modifications of attitudes or behavior that influence the way a human being acts, thinks or feels. Numerous forces, including the state, community, parents, students and the school, determine what the desirable behaviors of the learner, or learner outcomes should be.

Educational expectations provide the framework for the district to identify the basic skills and core learner outcomes through school and community participation. These educational expectations represent the long-term goals of the school and community described in broad outcomes.

The development of core learner outcomes has meant a rethinking about what domains of human experience and thought should be encountered commonly by learners. Educational expectations are derived from state-initiated core learner outcomes and outcomes developed locally, based on the community's needs and interests.

Roles

District management develops and carries out plans to allocate the physical, financial and human resources to promote student achievement of the learner outcomes. The local school board approves plans and allocates resources to promote the best use of district resources. Building-level management encourages and provides a climate of inquiry where individuals are valued and appropriate resources of space, time, technology and personnel are available.

Building-level management also facilitates cooperative efforts of teachers to assess unique student characteristics and instructional plans reflecting those characteristics and the learner outcomes.

The principal is an instructional leader in the school and community who actively supports the curriculum and instructional processes through the management of human and physical resources.

The teacher is a professional decision maker who designs, implements and evaluates instructional plans about what is to be learned and how it is to be learned. The teacher observes the needs, interests and capabilities of the learner which he or she uses to adapt the instructional plans.

Instruction is a set of events that acts upon and involves the learner through verbal and nonverbal communication. Many instructional events are planned and carried out under the direction of a teacher. Teaching is a form of instruction whereby an individual plans, arranges and sets in motion a series of instructional events intended to facilitate learning for one or more learners.

The processes of teacher-designed instruction are: assessment, planning, implementation and evaluation. Assessment is a process of data gathering and decision making about learners as they relate to educational expectations.

Planning is a process of organization whereby the teacher considers individual learners, selects a model of teaching, identifies resources and maps out a series of instructional events aimed at achieving desired learner outcomes. Implementation is the action phase of instruction where the tentative plan is strategically used by the learners and the teacher. Evaluation is a process of data gathering and decision making about learners, instructional events and educational expectations, to revise the educational expectations, change the instructional process or adapt to the learners.

A major influence on both cognitive and affective growth of the learner is the role taken by the teacher. The teacher's attitudes, beliefs and actions directly affect the success of each individual learner. An understanding of the instructional process provides teachers with opportunities to be both artful and scientific about the teaching act.

COMPONENTS OF THE INSTRUCTIONAL PROCESS

- The Learner
- The Teacher
- Teacher-Designed Instructional Events
- Educational Expectations

COMPONENTS

At the center of the instructional process is the learner. Learning events that are teacher-designed assist students in the acquisition of learner outcomes as defined by the teacher, building, district and the state. The teacher determines the flow of instruction through the selection of models of teaching. The learner is sometimes challenged to develop novel products, sometimes constrained to follow direction and at other times allowed to explore freely in a stimulating environment.

The roles of the teacher and the student may change based on a variety of factors. These include: the objectives; the teaching methods and strategies; the learner's developing capabilities, preferences and experiences; the physical environment; and the available resources.

THE LEARNER

The learner is a complex person made up of developing capabilities, preferences and experiences. Learning occurs in a variety of formal and informal settings. The purpose of schooling for the learner is to experience real-world learning events in an organized way and to maximize the individual's ability to integrate and adapt to an ever-changing environment. One result of a quality educational experience is when the learner invents and creates new knowledge.

Capabilities

Differing capabilities, preferences and experiences characterize the learner. Capabilities of the learner include potential for development in the social, emotional, moral, intellectual and physical domains. **Development is a change in behavior that is the result of maturational forces and experiences in the social and physical environments.**

As children grow to adulthood, there are common patterns of growth and development. Within these common patterns, however, wide variations in development are normal in the formative years for individuals and for groups. The varying levels of individual development in each domain need to be considered.

The learner is in constant transition to the next stage, responding in ways that are characteristic of more than one stage. Although the process of development is gradual and continuous, the stages of development represent clear differences in the integration and complexity of thinking.

Instructional events are planned for a common pattern of growth and development but are modified or extended to provide for variation in capacities. The teacher facilitates the expansion and use of prior learning and experience of learners. The teacher introduces new concepts and strategies which challenge learners' previous experience and knowledge and, therefore, extend the problem-solving abilities of learners.

Preferences

Preferences of the learner include the individual's learning style and interests. **Learning style, which is based on psychological type theory, encompasses the way in which learners focus energy and process information.** Extroverts focus energy outward toward the external world of people and things, while introverts focus energy inward toward the world of ideas in a reflective, introspective manner.

According to psychologist Dr. Carl Jung, all conscious mental activity occurs in two perception processes: sensing and intuition; and two judgment processes: thinking and feeling. Most people are sensing types who perceive directly through their senses. Some others intuit through a more indirect, abstract process of scanning information for an overall impression. Learners differ in their mode of judgment, with thinking types emphasizing analysis, logic and rationality, while feeling types emphasize possibilities, imagination and seeing things as a whole.

Learning styles are not fixed traits but relatively stable, enduring patterns of adaptation between the learner and the environment. All students should have the opportunity to work at least some of the time in their preferred learning style. An understanding of learning style promotes greater sensitivity to and appreciation of individual differences.

Experiences

Experience results from the interaction of the individual with the human and physical environments. Experiences are cumulative, unique and constructed by each individual. The culture shapes the context experience and its expression. Experiences influence attitudes toward and purposes for the next learning event or experience.

Because each learner brings unique capacities, preferences and experiences to an educational setting, learning opportunities are not identical for all human beings. The learner's involvement, performance and achievement is enhanced when instructional events match individual capacities and preferences and recognize the learner's varied experiences.

Learning events occur everywhere. The individual learns through viewing television, composing on a computer, reading a book, examining the properties of a rock formation or designing an experiment. However in the school setting, the learner usually encounters instructional events designed by a teacher.

THE TEACHER

The teacher is a professional decision maker who designs, implements and evaluates instructional plans for learners. The teacher makes use of knowledge about the learner, the curriculum content and instructional strategies to design experiences for a group of learners or to develop a plan for an individual learner.

TEACHER-DESIGNED INSTRUCTIONAL EVENTS

Instruction is a set of events that acts upon and involves the learner through verbal and nonverbal communication. **Teaching is one form of instruction whereby an individual plans, arranges and sets in motion a series of instructional events intended to facilitate learning for one or more learners.**

The goal of education is to foster learning. **Learning is a process, or set of processes, which results in increased knowledge and skills and/or modifications of attitudes or behavior that influence the way a human being acts, thinks or feels.** Although learning is difficult to measure, evidence that it has occurred may be observed through the behaviors exhibited and products created by the individual. Other learnings may be evidenced at a later time or never overtly observed.

EDUCATIONAL EXPECTATIONS

Educational expectations are developed from a commonly shared educational philosophy. Educational philosophy poses questions about the learner, the learning act, and the values to be acquired. In developing an educational philosophy, educators and the community engage in reflective thinking about human nature and the educational process to analyze current beliefs and their consistency with teaching and learning behaviors.

Educational expectations provide the framework for the district to identify the basic skills, state learner outcomes and goals and outcomes. Educational expectations represent the long-term goals of the state, school and community described in broad outcomes. Instructional events facilitated by the teacher encourage the development of competencies in support of the broad-based outcomes.

The development of learner outcomes has meant a rethinking about what domains of human experience and thought should be encountered by all learners. This has led to the expansion of the learner outcomes to emphasize the content of thinking, the development of social and interactive skills, and the strategies and procedures needed to use expanding informational resources and sophisticated technological tools.

Learners must become independent investigators who are skilled at solving problems in novel settings. The increasing complexity of world problems and societal relationships among culturally diverse populations requires individuals who are highly effective in relating to other human beings.

The following are some prerequisites for developing quality instructional design:

1. District goals and standards are developed, revised and broadly communicated.

2. An articulated curriculum that has district-determined content, scope and sequence, time allocations and student learner outcomes is developed and reviewed on an established cycle.

3. A positive work environment for educators, a quality learning environment for students, open communications and involvement of the parents and community is valued.

4. An evaluation system provides accountability and reporting to educators, parents and community.

THE DESIGN PROCESS

- Assessment
- Planning
- Implementation
- Evaluation

THE DESIGN PROCESS

The design process has four phases: assessment, planning, implementation and evaluation. An integral part of the design process is the teacher.

The teacher, acting as a team member or alone, is a professional decision maker who designs, implements and evaluates instructional plans for what is to be learned and how it is to be learned. The teacher observes the needs, interests and capabilities of the learner and these are used to adapt the instructional plans. The teacher's plans are implemented as instructional events and are based on educational philosophy, theory and practice.

Assessment

The purpose of assessment and planning is to design instructional events which match learner needs. **Assessment is a process of data gathering and decision making about learners as it relates to educational expectations.** The assessment process is made up of three components:

1. Teacher(s) and other professional staff gather data about the prior achievements, experiences, needs and interests of individual learners for planning instructional events.

2. The teacher assesses district-level expectations for learners and determines how instruction might be adapted for a variety of student needs. The teacher assesses the achievement of learners as related to district-level expectations. (District expectations are already set.)

3. The teacher determines the fit of broad curriculum goals to a particular group of learners and makes a preliminary judgment about matching the student with appropriate instructional activities.

In the assessment process, educators should consider sources of information such as: parental observations, student products, observation, test scores, interviews, questionnaires and anecdotal records.

Planning

Planning is a process of organization whereby the teacher considers individual learners, selects a model of instruction, identifies resources and maps out a series of instructional events, all aimed at achieving desired learner outcomes. In the planning process, the teacher considers the following components:

1. Objectives to be obtained;

2. Data gathered during the assessment phase about individual learners from learners, parents and professional staff and the learners themselves;

3. A model of teaching based on a variety of factors, including: the objectives; teaching methods and strategies; the learner's developing capabilities, preferences and experiences; the physical environment; and the available resources;

4. Identifying, selecting and organizing appropriate resources;

   a. media and technology such as: print and nonprint materials, computers, production equipment, interactive devices or other technological tools;

   b. setting(s) for learning within the school and community and arrangement of classroom environment to facilitate social, cognitive and affective development;

   c. human resources, such as: parents, experts, volunteers and paraprofessionals to enhance the learning opportunities; and

5. Strategies for reinforcement, management of student behavior and alternative teaching methods and resources.

An integral part of the planning phase is the selection of models of teaching. Within each of the models, the roles of the teacher and students have a slightly different focus. **Models of teaching describe the teacher's actions during the implementation phase of instruction and the student's responses to the instruction.** These models serve to describe the flow of instruction, rather than prescribing an exact plan or approach.

Models reflect the amount of teacher and learner choice in what is to be learned and how it is to be learned. They also reflect decisions about what learning itself is about. Learning may be viewed as a product, a process or both. Prepared with a tentative plan, the teacher moves to the implementation phase with the sure knowledge that assessment and planning will be an ongoing process as the teacher observes and interacts with learners.

Implementation

Implementation is the action phase of instruction where the tentative plan is tested by the learners and the teacher. Teaching is both science and art. The implementation phase may require the teacher to instruct in a non-preferred style to accommodate a variety of learner characteristics and instructional outcomes, and even to discard carefully laid plans in favor of more appropriate learning opportunities.

The teacher's unseen beliefs and attitudes about teaching and about learners influence what happens in the classroom. Although these beliefs and attitudes cannot be observed directly, their indirect effect on classroom climate, student affect and student performance is observable.

All quality teaching models have the following common elements:

1. Introductory activities that will motivate and focus the students' attention on learning.

2. Instructional opportunities which help students maximize their efforts through activities which include interactions, explanations, demonstrations, examples, resources and clarifications.

3. Monitoring/evaluation of efforts, process and product from the perspective of student and teacher.

4. Closure activities where learning and general significance of accomplishment for self and others is recognized.

Implementation must be preceded by careful assessment and planning and followed by meaningful evaluation.

Evaluation

Evaluation is a process of data gathering and decision making about learners, instructional events and the educational expectations in order to revise the educational expectations, change the instructional process or adapt to the learners.

There are two forms of evaluation: formative and summative. **Formative evaluation is an ongoing process of data gathering, analysis and decision making which may result in modification of the design process. Summative evaluation is a culminating process aimed at measuring the extent to which the educational expectations have been accomplished.** Both forms of evaluation are essential to the instructional process.

There are at least five goals of evaluation:

1. The learner is aware of growth and change and how well he or she is performing in relation to others.

2. The teacher diagnoses, advises and plans new instruction based on the needs of learners.

3. Parents know how the learner is progressing in relation to the attainment of the educational expectations.

4. Administrators know how well the instructional program is being implemented and identify areas for improvement.

5. The community understands how well the instructional program meets goals identified by the school and community.

THREE MODELS OF TEACHING: COMPARISONS AND CONTRASTS

- Directive Model
- Investigative Model
- Interactive Model

MODELS OF TEACHING

Models of teaching describe the teacher's actions during the implementation phase of instruction and the student's responses to the instruction. These models **serve to** describe the flow of instruction, rather than prescribing an exact plan or approach.

A model of teaching may be appropriate for particular learners, settings, times and conditions. These models represent a range of alternatives open to teachers in facilitating learning events. Models help to construct a vision about the flow of instruction occurring within a series of instructional events planned by the teacher.

Each of the models stems from a unique philosophical orientation and is supported by educational research. The models of teaching discussed in this book are: directive, investigative and interactive.

In the **directive model**, the teacher strives to assure a mastery of predetermined objectives to meet educational expectations as established by the school and community.

In the **investigative model**, the teacher establishes a broad-based objective and provides choices to the learner to explore more deeply the content and processes to be learned, and is open to learner development of additional objectives, methods of investigation and student products.

In the **interactive model**, the teacher focuses on the needs, interests and preferences of learners. The teacher arranges the social and physical environment, motivating the learner to engage in meaningful, self-directed activities. These experiences lead the learners to become autonomous themselves and to respect the autonomy of others.

Each model has critical attributes. Figure 1 shows the primary emphasis and outcomes for each model. See the Appendix for an outline of the characteristics of the three models.

Figure 1

Model	Primary Emphasis	Teacher Roles
DIRECTIVE	Mastery	Teacher determines outcomes and objectives
INVESTIGATIVE	Process/Product	Teacher determines outcomes. Teacher and learners determine objectives
INTERACTIVE	Experience	Teacher determines outcomes and learner determines objectives

Fig. 1. Critical Attributes of Three Models*

***See Appendix for an outline of the characteristics of the three models.**

An analysis of the primary emphasis and outcomes intended for each model is an influential factor in the selection of a model of teaching. A full understanding of strengths, limitations and conditions of each model is important to the design process. In contrast to the previous sections of this document which describe the design process in general terms, the following three sections provide specific information on the directive, investigative and interactive models of teaching.

DIRECTIVE MODEL

Orientation to the Model

With the directive model, the teacher strives to assure a mastery of predetermined objectives to meet the educational expectations established by the school and community.

The proactive teacher begins with the assumption that all students can learn and that he or she can make decisions which will maximize their opportunities for learning. "I can cause learning to happen," he or she says. The likelihood that students will acquire predetermined knowledge, skills or beliefs is directly related to the quality of teacher decisions at the assessment, planning, implementation and evaluation phases of instruction.

Two belief statements illustrate some of the assumptions underlying directive instruction:

"Time is the coin of teaching. Time is what teachers and students have to spend to buy learning. That time can be spent wisely with escalating learning dividends or frittered away with no learning return on its investment (Hunter 1976)."

"You can have a craft without an art, but you can't have an art without a craft," said the late photographer Ansel Adams, quoted by Madeline Hunter (Hunter 1981).

Efficient use of instructional time is a hallmark of this model.

Underlying Theory

The underpinnings of this model are based on theory and on studies of instructional practice. The pragmatic question, "What works?" was given priority over the theoretical question, "What ought to work?"

Learning theories explain how human beings come to know and how they are motivated to continue to learn. Major learning theorists such as Thorndike and Skinner worked in a laboratory setting with both human beings and animals to observe and control behavior. They found they could control behavior through schedules of reinforcement. The directive model builds on this research by providing for feedback and reinforcement while students are engaged in learning.

More complex behaviors have been studied by Gagne and Ausubel using human beings. The roots of task analysis are based on their work where complex behaviors may be divided into smaller parts and overtly taught. In recent years, researchers have been working with teachers to explore theory applications to classroom settings.

Many researchers were less interested in personality theory, learning theory or human development theory, and more interested in the practices of teachers in the field. Researchers, for example, observed classroom teachers who were considered "effective" and recorded their behaviors. They looked for behaviors or patterns of behaviors which reoccurred and identified four groups of behaviors which seemed to describe teachers in effective classrooms.

Rosenshine (1976) found that teachers who apply certain patterns to their teaching produce students who learn more rapidly and retain information for a longer period. He referred to these patterns of instruction as "direct instruction" or "explicit instruction." Rosenshine demonstrates a significant correlation between student "time-on-task" and measurable learner outcomes.

After a decade of studying the research on effective teaching, Rosenshine found that teachers of elementary math and reading who apply certain patterns to their teaching produce students who learn more rapidly and retain information longer.

This means that teachers are more effective when they:

Structure learning

Proceed in small steps at a brisk pace

Give detailed and redundant instructions and explanations

Provide many examples

Ask a large number of questions

Provide overt, active practice

Provide feedback and corrections, particularly in the initial stages of learning new material

Provide for frequent monitoring during seatwork

Divide seatwork into smaller assignments

(Rosenshine 1976).

The effective teacher provides for continued independent practice so that students have a success rate of 90 to 100 percent and become quick and confident about the material learned. In most cases, everyone does better, slower as well as faster students. Hunter (1967) stresses teacher decisions which will increase the likelihood that students will learn more, learn at a faster rate, remember what they learn, transfer learning and be motivated to focus their efforts on the task.

Another term frequently associated with teacher-directed instruction is "mastery learning." Mastery learning assumes that almost all students will learn when: 1) learning objectives are well defined; 2) learning activities are sequenced in a planned order; 3) instruction proceeds carefully with adequate time to develop; 4) learning is checked frequently and students are given specific, immediate feedback; and 5) students are tested on what is taught.

It matters very little whether we call it teacher-directed instruction, explicit instruction, active instruction or teaching for mastery. The common thread connecting all of these terms is a skilled, proactive, professional who confidently believes that his or her decisions and actions will impact the quantity and quality of student learning.

Brophy (1979) stated that certain teachers were more effective because they were more thorough and systematic in teaching. Stallings (1985) in a review of the research on effective use of classroom time concluded: "Engaged rates with a predetermined objective yield stronger correlation with achievement than do other time variables such as length of school day or time spent in instruction."

Assessment

During the assessment phase, the teacher assumes a role akin to that of a physician diagnosing the needs of a patient. Using formal test results, informal observations, a knowledge of student needs and interests based upon previous teaching experience, a decision is made about an instructional objective which is at the correct level of difficulty for students.

Examples of informal diagnosis include teacher-made pretests or quizzes and active responses from students to teacher questions, or "dip-sticking," which checks the entry knowledge of pre-selected "bell-weather" students or those whose response will predict that of the entire population. Given the limited time teachers have for assessment and planning, Madeline Hunter (1976) describes informal diagnosis as the "heart of diagnostic teaching."

Planning

During the planning phase, a teacher is most likely to select the directive model of teaching when the objective involves a well-structured, difficult set of concepts and procedures which builds one set of knowledge or skills upon another. The analogy of building a brick wall is often evoked--the second row of bricks cannot be set in place without the firm foundation of the first row.

A teacher also selects this model when mastery learning with long-term retention is the goal. Some examples are: mathematical computation, reading comprehension, vocabulary, musical notation, English grammar, world languages, science and social studies concepts or skill development. A limitation of the directive model of teaching is that it does not lead itself to creative and critical thinking.

Direct instruction, with its emphasis on careful pre-planning, teacher-defined objectives and maximizing time-on-task, is the method of choice when: 1) the skills, values or information taught are prerequisites for later learning; 2) the learning is incremental; 3) the learning is sequenced from simple to complex; and 4) the learning must be taught efficiently within the constraints of limited instructional time.

Based upon the diagnosis or assessment, the teacher formulates an instructional objective, which includes at least a statement of the learning to be acquired and the observable student behavior(s) which constitute evidence that learning has occurred.

If the learning is complex or requires several sequential steps, the teacher may write a task analysis, a sequencing of essential learnings to be acquired by the learner. In the following example, task analysis is used to specify skills and criteria for constructing a good paragraph:

1. Formulate an objective
   The student will write a good paragraph

2. Clarify the Objective
   Criteria for a paragraph are: topic sentence; three or more related, supporting sentences; proper punctuation; and correct capitalization.

3. List essential components
   Students have the ability to:
   1) capitalize, 2) punctuate, 3) select a topic, 4) write a topic sentence, 5) write supporting sentences, and 6) indent

4. Identify dependent/independent components
   Which components must be taught in a sequence and which can stand alone? Dependent: 3, 4, 5. Independent: 1, 2, 6.

5. Sequence-dependent components:
   The dependent components are:
   select topic, write topic sentence, write supporting sentences

6. Formulate and administer a diagnostic activity
   Can the student select a topic? Can the student ..., etc?

Implementation

Implementation is the action phase of instruction where the tentative plan is tested by the learners and by the teacher. This definition of instruction assumes that critical pre-planning has already been completed by the teacher. That is, one or more instructional objectives have been identified, decisions have been made about sequencing learning experiences and an entry point at the correct level of difficulty for the learners has been selected. The teacher using the directive model would not embark upon instructional interaction with students without this careful pre-planning any more than he or she would embark upon a cross-country trip without a clear destination in mind and a road map in hand.

What does a teacher look like who is teaching to an objective in a creative and imaginative way, with mastery learning as a goal? In a general sense, the observer will see teacher behaviors which are directly linked to the instructional objective. The information given to students, the questions they are asked, the activities they are engaged in and the teacher's response to student efforts will all be relevant to the instructional objective. In short, the teacher using the directive model works very hard at promoting successful learning time.

The directive model is not viewed as a recipe card to be followed blindly, but rather as the in-flight checklist of a proactive teacher who is constantly making and refining decisions while teaching. The teacher frames self-checking questions while teaching. For example: "Do I need to focus students?", "Do I need to provide modeling and practice?", "Do I need to facilitate closure?".

Figure 2 is a schema of the flow of instruction in the directive model. It illustrates both teacher and student roles.

Figure 2

In the directive model, the teacher strives to assure a mastery of predetermined objectives to meet educational expectations as established by school and community.

Teacher Roles	Student Roles
Introduces	
Focuses	Attends
Involves learners	Responds actively
Facilitates transfer	Reflects
Relates to objective	
Checks entry behaviors	
Motivates	
Instructs	
States objectives	Receives
Provides information	Reacts/Interacts
Provides activities	Compares
Asks questions	Assimilates
Responds to learner efforts	
Models	
Provides Practice	
Guided and Independent	Practices with guidance
	Responds to reinforcement
	Applies, Rehearses
	Processes/Produces
	Practices independently
	Responds to reinforcement
Monitors and Adjusts	
Reteach	Situational responses
Continue Practice	depend on teacher
Quit	strategy
Extend	
Facilitates Closure	
Elicits Generalizations and	Summarizes
Transfer of Theme, Issue,	Critiques
Problems	Applies
	Concludes
Evaluates	Demonstrates learning

Fig. 2 The Flow of Instruction Using the Directive Model

The following is a description of each phase of the flow of instruction with examples of teacher-student interaction.

Introduction

The purposes of the introductory or readiness phase are threefold: 1) to actively involve the learner, 2) to transfer relevant past learning and 3) to motivate the learner. If learners arrived each day highly motivated, eager to learn and free from outside distractions or competing interests, this step might not be necessary. To focus student attention, the teacher has made a conscious decision to use an anticipatory set as a means of achieving the introductory goals.

To be effective, the anticipatory set must actively involve the learners. The creative teacher chooses from a variety of attention-getting "hooks" to focus the learner's mind. A short sampling might include: a riddle or question on the blackboard, a relevant joke or high-interest story, a demonstration which prompts inquiry, time for students to reflect upon and share personal experiences which relate to the objective, a pre-test or quiz, a thought-provoking picture or videotape segment.

There should be opportunity for students to transfer relevant past learning to the new learning situation. The artful teacher will accomplish transfer in a variety of ways which might include: "Tell me all you know about this subject.", "What have we studied previously which is similar?", "How does this build on work we did last week?" , "Take the prequiz and show me what you already know." The benefit for students is that new learning is perceived as easier and less threatening if it can be linked to previous learning or life experience.

By using transfer, the teacher benefits from the opportunity to check the preplanned entry level of difficulty against the verbal and written overt responses of the intended learners. The proactive decision maker will consequently monitor and adjust teaching behaviors based upon the new diagnosis: "Do I need to reteach entry-level skills?", "Should I go ahead as planned?", "Do they already know what I was going to teach?".

Sometimes learners approach a task with intrinsic motivation and the task becomes its own reward. The skillful teacher will recognize this eagerness to learn and needs only to reinforce and encourage it. Students do not always approach a task with a high level of intrinsic motivation.

Madeline Hunter was once confronted by a teacher who suggested students were like horses--you can lead them to water but you can't make them drink. She said it was true that you could not make horses drink, but good farmers knew how to salt their oats.

Teacher actions create a feeling of excitement or curiosity while at the same time giving meaning or showing the usefulness of the learning. The teacher may describe how the knowledge, skill or product can be used in daily life. Connecting the learning with career goals or hobbies and special interests of the students has the same effect. Showing how the work is to be done today is critical to accomplishing the goal for the week, passing the unit test or motivating students. Linking the task to extrinsic motivators such as praise, grades or popcorn parties gives personal meaning and usefulness to the learning task.

The teacher may choose to use humor to maintain a positive and relaxed atmosphere. Additionally, the level of concern of disinterested students may be raised by announcing that the work they do will be on public display at parents' night. A well-executed introduction will prepare students for the instructional phase.

Examples:

Elementary

Student observers are told that the local newspaper would like a one-paragraph article describing the event they are about to witness. Al Jones, a fourth-grade teacher, has prepared two students to act-out an argument to be performed before the class. Prior to writing, each student is asked to think about what constitutes a good paragraph. Finished paragraphs are turned in to Al Jones, the "newspaper editor."

Secondary

Elena Lopez, an eleventh-grade teacher, has placed a page from the newspaper, which includes the New York Stock Exchange Table, on each of her economic student's desks. On the blackboard are the following questions: Have you ever seen this page of the newspaper before? What does it mean? Who would read this page of the paper? Why? Students are directed to select a partner and respond to the questions.

Instruction

It's time for the horses to drink. During the instruction phase of the lesson the teacher will restate the learning objective in terms that are clearly understandable to the learner. For example, the teacher might say, "When you leave class today, you should be able to..." or "By the end of this unit you should know and be able to...."

A typical next step is to provide the student with information, presented in a variety of ways, to meet varied learning styles. Some strategies may include: lecture, demonstration, film or videotape, a guest speaker, overhead transparencies, text reading or computer-assisted instruction.

Example

Elementary

Al Jones tells the students that the objective of the unit is to increase the likelihood that each of them will be able to write a good paragraph. He then defines a good paragraph as one which includes a topic sentence, has three or more supporting sentences, is punctuated properly and uses appropriate capitalization. Based on his task analysis and the diagnostic information gathered by reading paragraphs students wrote for the "newspaper," he has concluded that 24 students do not understand what a topic sentence is, 25 do not understand what supporting sentences are, eight have trouble with punctuation, and the same group of eight need help with capitalization.

Jones uses this information and knowledge about learning-style preference to prepare appropriate instructional activities. The eight students will be grouped for instruction in punctuation and capitalization. They will be taught basic rules and practice application using exercises from the textbook and a computer program. The other students will complete practice sheets on rules of punctuation and capitalization. The entire class will receive instruction on writing topics and supporting sentences.

Secondary

Elena Lopez tells her students they will be able to read and understand the New York Stock Exchange Table by the end of the week. Her diagnostic activity has confirmed that few, if any, of her students are able to comprehend the stock exchange table.

Lopez has discovered that most students do not understand the idea of "common stock." She must monitor and adjust, since her task analysis had assumed an understanding of "common stock" as entry-level knowledge. Capitalizing on the experience of four students in Junior Achievement, she creates a panel on how a corporation is formed and why stock is sold.

Modeling provides students with a powerful source of input. Correct models of a process or product are extremely important for students to see at this early stage of the learning process. It is of equal importance that they be made aware of the critical attributes which make the model correct. Students are protected from observing flawed or incomplete models which cause confusion and distortion.

Examples:

Elementary

Al Jones uses the overhead projector to show students examples of exemplary paragraphs. Students will have the same paragraphs in printed form on their desks and a printed list of the critical attributes of a paragraph. Students will see the paragraphs and hear them read aloud. Jones will point out the critical attributes in each sample paragraph. Students will be quizzed on their knowledge of the four critical attributes.

Secondary

Elena Lopez assumes the role of someone who owns stock in three corporations. She checks the progress of her investments using a stock exchange table. Companies familiar to the students are used. With a combination of demonstration, lecture and questioning, she explains how to locate a corporation on the table, how to determine the high, low and medium price per share and compute the dividend which the company paid.

Practice

Guided practice with reinforcement is designed by the teacher. Guided activities allow the student to demonstrate, build, refine, integrate and internalize experiences acquired through instruction. The practice is "guided" because the teacher assumes the role of a coach, providing specific reinforcement for appropriate student behaviors and continuing to focus and motivate students with immediate and specific knowledge of results. This also gives the teacher an opportunity to positively reinforce correct learning and to intervene to modify incorrect learning. Success is assured when the student is working on a task at the correct level of difficulty.

Practice sessions are usually short, concentrated and allow students to practice the smallest part of the learning which is meaningful and relates to the correct level of difficulty. The teacher coaches, reteaches using different strategies and materials and reinforces appropriate behaviors as needed.

If the class or individual students demonstrate success during guided practice, independent practice such as homework is the next step. Independent practice usually involves a longer practice session, with students practicing larger chunks of material. "Practice," quips Madeline Hunter, "doesn't make perfect--it makes permanent."

Examples:

A. Guided practice will be provided by asking each student to write a paragraph. A partner will then circle and label the critical attributes. Al Jones will circulate among students during this activity, providing assistance and reinforcement.

Independent practice will be in the form of a homework assignment to write a paragraph describing a pet or family member. The paragraph must contain all critical attributes.

B. Elena Lopez provides a guided practice activity by designing a game which requires a student on one team to choose a corporation from the stock exchange table. A student on the other team must, within one minute, locate the company and provide all relevant data in dollars and cents. The teacher, as scorekeeper, reinforces correct responses and reteaches when correcting errors.

To build long-term retention, Lopez designs a simulation in which each student is given $10,000 to "invest" in up to three companies of his or her choice. The companies must be listed on the New York Stock Exchange. Monthly progress reports during class time cause students to practice reading and interpreting the stock exchange table on an intermittent basis.

Monitoring and Adjustment

The teacher uses the ability to "scan the field" and "read" the needs of learners during the process of monitoring student behaviors and adjusting teaching. Monitoring is especially critical during guided practice when the overt efforts of students are clearly observable. Decisions available to the teacher include reteaching all or part of the lesson, extending the time for practice, moving ahead, and extending the depth of learning or quitting.

Examples:

A. Based upon observations of overt student response to questions, the paragraph written for a partner, and the homework paragraph, Jones has concluded his teaching objective has been met.

B. Based upon observations of overt student behavior during classroom activities, Lopez concludes that students are unable to convert fractions such as 3-1/8 or 6-7/8 to dollars and cents. She will reteach that part of the lesson and provide further practice of that skill.

Facilitating Closure

Closure may occur before or after formal evaluation and helps students to actively summarize and consolidate learning. Students do the summarizing. Some closure activities are: asking students to write "I learned" statements, having students "reteach" the lesson, and/or asking students to explain or demonstrate what they have learned to an imaginary person or another student.

Closure activities also afford the teacher another opportunity to monitor student performance and adjust teaching. Students who demonstrate competence may, for example, be encouraged to extend their thinking by giving original examples, applying what they have learned to issues or problems, and generalizing to other areas.

Examples:

A. Al Jones asks his students to review in their minds the qualities of a good paragraph. After some time for thinking and/or writing down ideas, the students will be asked to tell two students, who were absent when the unit was introduced, what they know about the components of a paragraph.

B. Elena Lopez divides her class into teaching teams of 4-5 students. The teams' task is to prepare a lesson that would teach someone unfamiliar with our economic system how to read the New York Stock Exchange table. Numbers will be drawn by Lopez and "lucky" teams will teach their lesson to the class.

Evaluation

Evaluation may be informal or formal. Quizzes, verbal questioning, demonstrations by students, final projects, formal tests, essays and videotapes provide the teacher with ways to measure the degree of mastery achieved by students.

Examples:

A. Al Jones evaluates student growth on an individual basis by re-enacting a classroom incident which must be described in paragraph form. He compares the paragraphs written for the introductory-diagnostic activity with those written after instruction has been completed. Criteria used in grading the papers is inclusion of a topic sentence, three or more relevant supporting sentences, proper punctuation and correct capitalization.

B. Elena evaluates student knowledge and understanding of the New York Stock Exchange table by placing the names of corporations listed on the exchange on pieces of paper. Students draw a company "from the hat." They must locate it on the table and interpret all information provided in narrative form. They must also explain who would read this table and why.

There are many creative ways to increase motivation, improve retention, encourage transfer of learning and speed the learning process. In summary, the teacher is a skilled professional who makes decisions based upon learning psychology and educational research in an artful fashion, which greatly increases the likelihood that students will learn.

INVESTIGATIVE MODEL

Orientation to the Model

In the investigative model, the teacher establishes a broad-based objective and provides choices to the learner to explore more deeply the content and processes to be learned and is open to learner development of additional objectives, methods of investigation and student products.

In the investigative model, students become specialists in a field of study. Acting as detectives, they may investigate a major theme, issue or problem and collaborate with peers to develop a final product. The teacher coaches both thinking processes and technical skills used by the students during the ongoing phases of investigation and production. Although the parameters of investigation have been broadly established, the teacher is open to negotiation regarding the content to be explored and the format of the student products.

Two belief statements illustrate some of the assumptions underlying the investigative model:

Students must be active participants in their learning experience. It must involve purposeful goal seeking, diagnosis, creating hypothesis, rehearsing action in one's mind, connecting causes to effects, finding commitments, seeing a relationship between each step in long-range aims...(Thelen 1960).

An overarching objective for most classroom teaching is the development of capable, responsible, self-motivated human beings who can carry out a variety of complex tasks as situations demand. (Corno and Mandinach 1983). Student independence in thought and action through the engagement of the learner in open-ended and complex tasks is the hallmark of the investigative model.

Underlying Theory

The investigative model is strongly rooted in the work of John Dewey. Dewey believed that basic education for all students should be founded upon rich experiences which promote students' ability to think and solve problems. The work of more recent researchers who seek to describe the phases of instruction in social or information-processing models of teaching may be traced to Dewey's theory.

According to J. P. Guilford (Maker, 1982), intelligence has three facets or dimensions: 1) content or information; 2) mental operations; and 3) products. The design of instructional tasks and the implementation of an investigative model of teaching support the full development of these capacities.

Emerging definitions of the complexity of thinking and the development of this capacity in all learners have altered the current view of intelligence. Intelligence may be viewed as "...the ability to deal with novel kinds of tasks and situational demands and the ability to automatize information processing (Sternberg 1984)." Thus learners acquire cognitive skills which help them to respond flexibly to growing bodies of information and increase their abilities to learn new information.

The construction of tasks which are presented to students in the investigative model is supported by the work of Jerome Bruner. Bruner stated, "What emerges from the past decade of experimenting with instruction is the importance of increasing the child's power of thought by investing for him (her) modes of access to the empowering techniques of the culture... (Bruner 1971)."

Brophy describes research on strategies for motivating students to learn by capitalizing on intrinsic motivation. These strategies are: adapt tasks to students' interests; include novelty/variety elements; allow opportunities to make choices or autonomous decisions; provide opportunities for students to respond actively; allow students to create finished products; include higher-level objectives and divergent questions; and provide opportunities to interact with peers (Brophy 1987).

"For high level cognitive learning outcomes, such as identifying concepts, analysis of problems, judgment and evaluation, less structured cooperative techniques that involve high student autonomy and participation in decision making may be more effective than traditional individualistic techniques (Slavin 1980)."

The ability to make meaning from experience is a distinctly human characteristic and is a survival skill for adult learners in an increasingly complex world. The translation of the students' investigative efforts into meaningful products evidences their capacity to think and communicate with others through symbols.

Gardner notes: "What characterizes human intelligences as compared to other species is their potential for being involved in all manner of symbolic—activity—perception of symbols, the creation of symbols and the involvement of meaningful symbolic systems of all sorts...in a world of meaning (Gardner 1983)."

The teacher is an instructional designer who constructs meaningful tasks, provides sufficient time for in-depth study, and guides students through the various stages of investigation and production.

The Investigative Design Process

Assessment

During the assessment phase, the teacher acts as a playwright who understands the motivations and attributes of each character who participates in an ongoing extemporaneous drama. The playwright uses this information to construct new situations and problems for the characters to resolve.

The teacher notices student learning styles and reviews student work. An interest inventory provides additional information which the teacher uses for the design of student tasks.

Planning

The teacher selects the investigative model when he or she seeks to challenge motivated learners, high ability learners, and/or to increase the motivation of students to learn. The teacher selects the investigative model to develop higher order thinking, the acquisition of cooperative skills and the fostering of self-directed learning in a climate of inquiry.

When a broad-based objective is to be mastered, the teacher constructs meaningful activities which foster exploration and integration of a concept or process. For example, when students are studying a topic in history, individuals may become specialists in certain areas of the topic.

The teacher selects the investigative model when group or independent investigation is a major component of a unit and a variety of instructional activities are devised to accommodate student interests and abilities. A variety of resources are gathered for use within and outside the classroom. Due to the diversity of student interests and tasks, advanced planning of resources is required.

Implementation

Implementation is the action phase of instruction where the tentative plan is tested by the learners and the teacher. This definition of instruction assumes that critical pre-planning has already been completed by the teacher, that is, the teacher establishes a broad-based objective to be mastered and provides choices to the learner to explore more deeply the content or processes to be learned.

The teacher using the investigative model would not embark on instructional interaction with students without this careful pre-planning any more than he or she would embark upon a cross-country trip without a clear destination in mind. The students plan to travel together guided by the teacher, an experienced traveler. Individuals and small groups set forth to explore the territory, become specialists in a particular region and discover new locales for future expeditions.

Figure 3

In the investigative model, the teacher establishes a broad-based objective and provides choices to the learner to explore more deeply the content and processes to be learned. The teacher is also open to learner development of additional objectives, methods of investigation and student products.

Teacher Roles	Student Roles
Introduces	
Focuses	Attends
Motivates	Responds
Instructs	
States broad objectives	Receives
Provides exploratory activities or examples	Reacts Compares
Explains, demonstrates	Assimilates
Provides Choices	
Facilitates selection	Chooses
Negotiates	Negotiates
Develops Evaluation Criteria	
Negotiates	Accepts, modifies, suggests criteria
Monitors, Interacts, Communicates	
Observes	Receives
Guides	Responds
Coaches	Adjusts
Affirms	Sustains commitment
Teaches procedures	Explores
Teaches thought processes	Integrates Produces
Evaluates	
Uses product criteria	Accomplishes
Provides feedback	Participates in evaluation Communicates Shares products
Facilitates Closure	
Elicits responses, shares group observations	Summarizes Applies
Elicits generalizations, transfer of concepts and processes	Critiques Concludes

Fig. 3. The Flow of Instruction Using the Investigative Model

The following is a narrative description of each phase of the flow of instruction with examples of teacher-student interaction.

Introduction

The student's attention is captured and focused for new learning.

A. Jeff Gallagher asks his students to be detectives and uncover the locations of different types of plants in the building. They will discover and describe the location of the plants (place, light or dark, temperature). What does the plant look like: size, color, healthy or sick, drooping, etc.?

B. Diane Smith reads a "news bulletin" about the arrest of Martin Luther King as if she were reading it from the daily newpaper.

The teacher constructs activities or introduces the objective with an action designed to arouse curiosity. The teacher constructs a motivational activity which increases motivation through:

1. Novel, incongruous, conflictual and paradoxical events:
2. Anecdotes and other devices for injecting personal, emotional elements into otherwise purely intellectual or procedural material;
3. The opportunity for students to learn more about things they already know about or believe in, but also giving moderate doses of the unfamiliar and unexpected;
4. Analogies to make the strange familiar and familiar strange;
5. A process of question generation and inquiry.

(Keller 1983)

A. The students return from their observations and Mr. Gallagher conducts a session where students report their findings. A discussion around the idea of favorable environments for plant life ensues. Gallagher asks them for their theory on why some plants seem healthier. He suggests that students experiment with these ideas by growing their own plants. One student responds, "My mom has lots of violets. I can bring one of those."

B. Smith asks the question, "Is it ever right to break a law?"

Instruction

The teacher describes a concept and/or process to be acquired, expanded and/or mastered.

A. "Earlier this year, we developed a hypothesis about pods. We found that the size of pods had nothing to do with the number of seeds inside." Mr. Gallagher holds up the bar chart they used in a previous study and reminded them that was one way to show the results of their study.

B. Smith describes to the class that the objective of the next unit is to examine the nature of protest, make generalizations about what type of protest is effective, and develop a plan of action for a group seeking to change a policy.

The teacher elicits student responses regarding their previous knowledge and experience related to this objective, describes the uses of the concept or process, and demonstrates how a concept or process fits into a broader picture or scheme. Students are aware of both the general "territory" of a concept or process and its usefulness.

A. Gallagher asks, "What are the factors that affect the growth of plants?" Students respond by describing light, heat, water, etc. Using student input, Mr. Gallagher narrows the factors to: temperature, water, nutrients and light.

B. "Today we will begin a unit on the nature of protest. In pairs, write a list of all the words you can think of which come to mind when you think of protest," Smith said.

The teacher plans a set of questions which increase in complexity, poses a problem to solve, or reviews and/or demonstrates and simulates the steps involved in the use of strategy or method.

A. Gallagher asks, "What are the factors that affect the growth of plants?" Students respond by describing light, heat, water, etc. Using student input, Mr. Gallagher narrows the factors to: temperature, water, nutrients and light.

B. Smith reads a famous quote by Stokely Carmichael, "Violence is as American as apple pie." When presented with an action plan by striking employees which includes violence, students are asked to analyze the costs and predict the potential benefits of such action.

Providing Choices

The teacher offers a menu of carefully constructed tasks to individuals or small groups and is open to the student initiation of activities within the prescribed parameters of the broad-based objectives.

A. Students are organized into small groups and must decide which variable (light, temperature, nutrients or water) will be the focus of their study.

B. After exploring the concept of protest, students are organized in groups and select from three tasks. They may choose to 1) study the historical nature of violent and non-violent protest and present a summary to the class in the form of a research paper or speech; 2) act as political consultants and marketing specialists and construct a protest plan for a new organization which seeks to eliminate nuclear weapons; or 3) examine the nature of protest as it is expressed in the arts and develop a musical and slide presentation of such works.

The teacher bargains with students to develop a task which is challenging and falls within the broad objective, yet is responsive to student interest in both content and product format.

A. One group said they wanted to test two variables: light and music. The students want to use the music of Bon Jovi to see if it will cause the plant to grow larger. They want to test plant growth under two conditions using four plants: 1) low light and music; 2) low light only; 3) high light and music; and 4) high light only. Gallagher agrees but requires them to develop two different charts.

B. One group requests the opportunity to study "works" of protest and compose an original song. Smith agrees to accept a written report regarding music and art protest pieces and accepts the development of an original song.

The teacher assists students in the development of reasonable and appropriate criteria for judging student work. The criteria should relate to both the content and the format of the task or product.

A. Students are reminded of the criteria for scientific investigation. Mr. Gallagher reminds them that they must set up an experiment with one variable, write a hypothesis, record daily observations in a log, present their data on a graph or chart, draw a conclusion based on their observations and report their conclusion to the class. Investigations must be completed in three weeks.

B. Smith confers with each group and constructs criteria. Smith asks, "What are the characteristics of effective _____?" For example, effective slide shows are sequenced, scripted and organized around a central theme; artistically pleasing; and have a beginning, middle and end.

Students suggest and negotiate criteria for evaluation of their work with the teacher. Determining the evaluation criteria in advance of the work assists students in visualizing the goal or end product and working toward the completion of a task or product.

"The first step is to consider how people typically communicate results or products within given fields of arts and sciences. In most cases, young artists and scholars will be restricted to local outlets and audiences, but there will be occasions when products of unusual excellence can be shared with larger audiences (Renzulli 1986)."

A. Billy asks, "Can a plant grow without soil?" Gallagher asks them if they know of any plants that grow without soil. Mary says she had a potato plant which was growing in a glass filled with water. The students ask , "Can we try to grow a plant in water from seeds to having flowers?" Gallagher asks the students to investigate the idea and write a new problem statement. Gallagher helps the students design a new experiment.

B. One group requests that a time limit on presentations be established and that the artistically pleasing category be excluded due to the lack of appropriate tools for developing a creative project. Smith agrees on the time limit and encourages the group to explore the tools in the school computer lab.

Monitoring/ Interaction/ Communication

The teacher o[illegible]ves the activities of students and guides them as they work independently or in groups. The teacher asks focused questions, expresses encouragement or suggests resources and/or methods. The teacher encourages group members to share knowledge, develop solutions and work cooperatively toward the goal.

A. "Are your plants changing?" the teacher asks. "In what ways are they changing? How are you measuring this change? Who is in charge of the daily log?" Gallagher praises Billy's group for its detailed entries. He points out to the class the way Mary's group has used color to show the changes in their plants.

B. "What seems to be working? What problems are you having? How are you coming along? That looks interesting. How are each of you contributing to the success of this project?" Smith requests that students send her "progress notes" and observes the stages of production. She notices the early stages of work and expresses encouragement. Notable achievement is recognized. The importance of the project is discussed frequently. Time is provided for student work.

The teacher decides when a strategy of direct instruction is needed by observing student progress. This decision is based on the content, the nature of the task and the strategies which are already part of the learner's repertoire. The teacher describes the strategy, outlines the procedural steps and the conditions under which the strategy is used and assists the student in the application of this strategy to the task at hand (Jones, Palincsar, Ogle, Carr 1987).

Weinstein and Mayer "... suggest a taxonomy of strategies including: 1) affective strategies that serve to focus attention, minimize anxiety and maintain motivation; 2) strategies that serve to monitor learning such as self-questioning and error detection; and 3) strategies that serve to organize information, such as clustering and outlining, including graphic outlining (Jones et al. 1987)."

A. Gallagher observed Aron's group was unhappy, having difficulty reporting its observations and working together. Gallagher asked if he could work as a member of that group. He models possible observations and cooperative group skills by encouraging discussion, reflection and support.

B. A group of students are troubled about how to organize all the music and arts which have been uncovered. Smith asks them to describe the process of classification. Students are invited to suggest categories for their record collections. They play with this idea. Smith asks them to apply this system to organizing their research. The students spend the remainder of the class hour suggesting classification systems for the artwork.

Evaluation

The teacher and students participate in the evaluation by reviewing the processes employed, critiquing the final product or task completed. If student work is shared with a wider audience or field-related expert, the reactions to the work are discussed in the evaluation phase.

"Productivity can be defined in several ways: the amount and quality of product or output (e.g., school-test achievement); the quality of the process (e.g., fairness, openness, standard of evidence) through which the product was produced or the conclusion reached; and the growth of capability to produce more effectively (as measured by either process or product) (Thelen 1981)."

A. The group that tested music and light presents its chart and results to the class. Group members are excited when they report that the music seemed to make a difference. Gallagher suggests they contact a botanist regarding their study and share their results.

B. Students play their composition and class members critique the song based on the criteria of lyrics, sound, rhythm, appeal and melody. A tape is mailed to a local disc jockey.

Facilitating Closure

The students describe the stages of their work and discuss how they might use the knowledge or experience acquired in another learning episode or life experience. "Finally, the group evaluates its solutions in terms of its original purposes. The cycle repeats itself, either with another confrontation or with a new problem growing out of the investigation itself (Joyce and Weil 1986)."

A. Gallagher asks, "Were there other variables or factors that might have been involved in the growth of plants? How did this experiment contribute to your understanding of how plants grow?"

B. Smith asks the students to develop a list of "gains" which have added to their individual strengths. This list is shared and Smith acknowledges the growth of the students by describing their strengths.

The teacher encourages students to state the "big ideas" which have emerged from the investigation process. The students elaborate on their generalizations by providing examples. Thus, the teacher provides the opportunity for students to clarify, integrate and extend their conceptual knowledge.

A. Gallagher asks the students to describe what kind of environment they need to bloom. "In what ways are we like plants?" he asks.

B. Smith asks the students to develop the "ten commandments" of protest.

The teacher elicits responses when he or she asks students to describe the connections between a concept or the use of a process in other settings, education endeavors or situations. The teacher may devise a short lesson where generalizations may be applied to a related area.

A. Jennifer suggests that the class members become plant doctors and assist other people in their school in the care of the plants.

B. Students are encouraged to examine how protest may be used positively to bring about needed change in their community.

INTERACTIVE MODEL

Orientation to the Model

In the interactive model, the teacher focuses on the needs, interests and preferences of learners. The teacher arranges the social and physical environment, motivating the learner to engage in meaningful, self-directed activities. These experiences lead the learners to become autonomous themselves and respect the autonomy of others.

The goal of the interactive model is the development of the learner in the social, emotional, moral, cognitive and physical domains. Development is a transformation of thought-organization which becomes increasingly differentiated, integrated and complex within each of the domains. The learner continuously constructs new knowledge from previous experiences and from each new interaction with the social and physical environments.

Two belief statements illustrate some of the assumptions underlying the interactive model of instruction:

The teacher appreciates and encourages individual differences in learning and development and nurtures the learner's unique style, preferences and experiences.

The learner in the interactive model constructs a personal world view that evolves from experience. Although the learner's view of the world will be imperfect and incomplete in terms of objective knowledge, the teacher both accepts the learner's current ideas or solutions and analyzes the learner's thinking. Through questions or through introducing new objects or information, the teacher continues to challenge the learner's ideas and to present discrepancies or new and contrasting viewpoints. Through this process, the learner constructs a more complete and accurate understanding and arrives at qualitatively better ways of thinking. The learner's thought is transformed into new and more complex ways of knowing.

Because development depends on experience, experience is the distinguishing characteristic of the interactive model.

Underlying Theory

The interactive model is based on theories with assumptions about human nature, development, knowledge, learning and motivation. The observational research of Jean Piaget contributes to an understanding of development and instructional methodologies used in the interactive model. Piaget studied the childhood origins of knowledge in the areas of logic, space, time, chance, morality, play, language and mathematics.

Clinical insights and research of Erik Erikson form the basis in the model for understanding developmental tasks necessary for social and emotional growth. The philosophical and educational theories of John Dewey contribute to an understanding of motivation and to educational content within this model.

Human beings are active and inquisitive, seeking out as well as responding to new experiences in the social and physical environments. New knowledge is constructed by the human being from interactions with others, interactions with living things and objects in the physical environment, as well as by interactions within the person through reflection. The uniqueness of each individual is expressed in different forms, patterns and rates of development.

Normative development refers to broad changes that occur in human beings according to a fairly standard timetable. Changes reflected in areas such as motor or language development follow sequential, cumulative patterns which are observable in developing children throughout the world.

Dynamic development is another form of development. It occurs when thought organization becomes more integrated, more differentiated and more complex within each of the cognitive, social, emotional, physical and moral domains. Dynamic development occurs at different rates within the individual in the different domains. Each new stage offers new reasoning possibilities that were more limited in a previous stage.

The learner is active mentally and physically in constructing knowledge. New experiences may add to or consolidate the learner's earlier ways of thinking. Or, new experiences may provide incongruencies that force the learner to reconsider earlier beliefs and seek new solutions; when this occurs, new frameworks become the basis for more advanced levels of thinking.

The learner uses different ways of knowing and experiencing the physical, social and logical-mathematical worlds. Because of this, the teacher's role changes when helping students gain access to new understandings of social, physical and logical-mathematical knowledge.

Physical knowledge is discovered from the properties of objects or living things in the physical world. The teacher provides learners with opportunities to observe and act upon real objects in the physical world to understand for themselves the object's properties. By acting on objects, the learner discovers what objects can do, such as: sink, float, roll, bounce, break, bend, stick, melt or evaporate. For understanding of physical knowledge, the teacher asks questions, poses contradictions, offers counter-examples or suggests a strategy for the learner to use to find out.

Social knowledge is specific to a particular culture and is communicated through its symbols, language and rituals. Because learners cannot discover societal conventions and customs systematically on their own, social knowledge is shared with students to help them successfully participate in society. The teacher communicates social information directly to the learner. For example, the teacher explains how disadvantaged populations experience discrimination, tells students how the elective process works, or suggests that students read about how a bill becomes law in the legislature.

The learner produces logical-mathematical knowledge by mental thought which creates relationships between and among objects and events. "First," "heavier" and "lumpy" are examples of logical-mathematical relationships that a learner imposes upon an object. While the objects or events are observable, the mental relationship is not observable and does not reside in the objects or events. To help students develop logical-mathematical understandings, the teacher needs to focus on developing the child's logical ability as a foundation for mathematical activity. Instruction needs to be appropriate to the learner's level of reasoning.

Interest is critical to efforts by the learner to make sense out of experiences in the environment. The teacher has a role in finding intriguing objects, issues or ideas to motivate the learner.

In the interactive model, the teacher combines the three roles of program developer, program implementer and program evaluator. The teacher plans and prepares the environment and learning experiences based on assessment of learners' needs and interests in order to achieve particular learner outcomes.

The Interactive Design Process

Assessment

During the assessment phase, the teacher observes the student with the objectivity of a scientist and the appreciation of a mentor who cares about the development of all aspects of each individual. The teacher gathers available information about the developmental level, prior experiences, prior learnings, individual characteristics and interests of the learners.

The learner is involved in both the diagnostic and goal setting processes. Samples of the learner's work, such as writings, drawings and models are examined and discussed by the teacher and student. Because interest is important for intellectual development and for understanding of the subject matter, the teacher finds out about the interests of the learner. New learning goals are established which support the student's interests and are consistent with educational expectations.

Planning

During the planning phase, the teacher plans and organizes appropriate learning environments, materials and resources, and types of experiences for the learners based on the information gathered during ongoing assessment. Because the classroom environment is dynamic, the curriculum is continually reorganized and the environment is reconstructed on the basis of assessed learner needs.

The interactive model encourages curriculum integration across subject areas, and the teacher has responsibility for identifying broad curricular content frameworks. For example, learning centers and thematic units may be used to integrate content from a variety of subject areas. Each learning center has multiple activities as well as the same activities at several levels of difficulty. Thematic units or projects bring together firsthand experiences of the learner and allow the learner to reinvent or reconstruct experiences.

Subject area teachers design learning environments which integrate their assigned specialty area with other supporting content areas. In this environment, there are opportunities for multiple approaches to exploring concepts.

The teacher and the learners provide abundant, varied and real-life materials through resources from outside the classroom and through taking classroom materials out into the community. Materials are open-ended and may be interpreted and used in novel ways. A variety of meanings are formed by students through the use of a common set of resources.

The teacher is a thoughtful arranger of the learning environment to entice and challenge the learner to explore and interact with others and with materials. The teacher plans for a wide range of experiences and a variety of materials that engage learners both physically and mentally in activities which permit learners to manipulate, explore, discuss, rediscover and reinvent.

A major component of the planning stage is the accumulation of rich and varied resources which support the implementation of the interactive model.

Implementation

Implementation is the action phase of instruction where the students begin to interact with one another in the environment prepared by the teacher. This definition of instruction assumes that critical pre-planning has already been completed. The teacher using the interactive model would not embark upon instructional interaction with students without this careful pre-planning any more than he or she would start out on a cross-country trip without a clear destination in mind. The students are explorers who may travel on uncharted paths. Many side trips are possible. It is the journey rather than the destination which becomes important in the interactive model.

A moderate amount of discrepancy needs to exist between the learner's present understanding and a new conversation, event or experience for new learning to occur. A teacher's role is to provoke those experiences that lead the learner to rethink or question a previous belief. The student must wrestle with a new concept and is forced by new evidence to modify an existing belief.

As different points of view are shared, learning is facilitated through the social interaction with peers and adults who have different perspectives, desires and ideas. Social and moral issues are discussed when they arise from interactions among the students and between teachers and students.

The teacher enables learners to see interrelationships between different types of knowledge through integration of knowledge and processes from several disciplines. The teacher models active learning and involvement through interest, enthusiasm and the continuing pursuit of knowledge. By creating a varied physical environment intriguing to learners, the teacher elicits learner interest and motivation to learn.

What does a teacher look like who is teaching in the interactive model where student-initiated learning is a goal? He or she seeks to establish a warm relationship with the learner and to be a companion and guide while permitting the learner, rather than the teacher, to be at the center of the educational activity. The teacher observes and interacts with students in the prepared environment. In the interactive model the teacher is flexible and responsive to the changing needs of the learner.

The teacher frames self-checking questions while teaching. For example: "Should I intervene with Jim and Billy?", "Are a variety of solutions surfacing?", "Does Mary need a microscope?", "Should I check to see why Sally hasn't made a choice?".

Figure 4 is a schematic of the flow of instruction in the interactive model which illustrates both teacher and student roles.

Figure 4

In the interactive model, the teacher focuses on the needs, interests and preferences of learners. The teacher arranges the social and physical environment, motivating the learner to engage in meaningful, self-directed activities. These experiences lead the learners to become autonomous themselves and respect the autonomy of others.

Teacher Roles	Student Roles
Introduces	
Offers Choices	Selects
Suggests Alternatives	Sets individual goals
Interacts, Communicates	
Observes	Chooses
Records observations	Explores
Encourages	Sustains interest
Guides social interactions	Interacts with peers
Participates or models	Communicates
Instructs	
Questions	Responds
Interviews	Shares
Provides feedback	Hypothesizes
Provides clarification	Constructs
Offers suggestions	Produces
Provides resources	Pretends
Teaches procedures	Accomplishes
Demonstrates	Experiments
Evaluates	
Elicits responses on process	Responds
Collects samples of student work	Describes
Provides feedback on interactions	Receives
Elicits self-evaluation	Evaluates
Facilitates Closure	
Elicits responses	Shares experiences
Encourages group observations	Critiques
Elicits conclusions	Summarizes
Elicits generalizations	Generalizes

Fig. 4. The Flow of Instruction Using the Interactive Model

The following is a description of each phase of the flow of instruction with examples of teacher-student interaction:

Introduction

The teacher's role in the interactive model is an active one that begins with the preparation of the environment for interactive learning. The learning environment is learner-centered and invites active involvement by the types of materials and experiences which are available. Within this environment the learner makes choices from the alternatives provided while the teacher facilitates the decision-making process and suggests alternatives when appropriate.

A. Bill Lang's second-grade students select topics for a project based on strong interests of a particular child or a group of children. Three examples reflect the diversity of topics selected. Lang feels almost any topic of major interest to a child can be the basis of an interesting study. The timing of the project's initiation, development and completion is not the same for all students.

After a field trip to a locksmith's shop, five students want to reconstruct what they had seen and heard during that visit. Two children want to work together to find out more about flags. Their interest in this topic was sparked by a view of all the different flags they saw during the Olympics.

Lang discusses selection of a topic with a girl who says she likes dogs. Lang asks where she might go to learn more about dogs. After some discussion of places she has seen interesting dogs, the child decides to study the dogs in her neighborhood. "How will you decide the number of dogs to study?" he asks. The student describes the neighborhood and they determine that in a two-block radius of the child's house there are many dogs. The student decides to interview the dogs' owners. Lane asks what she will want to find out. The student decides to develop a list of questions to ask the owner of the dog.

B. June Pinsky has assembled a collection of books, tapes, videos, videodiscs, pictures and resource materials of all kinds. These materials relate to the art, architecture, music and literature of different historical periods. A few weeks ago, she invited her eleventh-grade students to add to her collection of these materials.

She invites the students to browse through the materials, exploring the architecture, music and literature of different historical periods. Eventually, she asks her students, "Is there a relationship among the creative arts of a given time?" One student responds, "During the Vietnam War, the arts reflected the protest movement." Another student says, "Rich people paid artists to paint pictures during the Renaissance period."

June Pinsky encourages the students to select a historical period where the students believe there was great creativity. Several students choose to study the music and architecture of the fifties. Other students study different periods: the Middle Ages, the age of the Industrial Revolution and the Sixties.

Interaction and Communication

The teacher observes the types of learning experiences and activities the learner is selecting; and challenges, suggests, stimulates and encourages the learner's involvement with materials, experiences and peers.

Examples:

A. Lang observes the beginning of construction of the locksmith shop which is being made of blocks and cardboard boxes. The group has begun to collect old keys from the children in the classroom, but they want to ask other children in the school for help. Lang asks them to consider a good time to seek help from other classrooms. They decide to make posters for the school cafeteria to make their desires known.

The two boys studying flags are reading in the encyclopedia about flags of different countries. One boy wants to classify the flags by color but the other boy prefers to group the flags of countries with a continent. Lang listens to the arguments pro and con and offers a few comments on each side of the argument.

The girl who has developed the questionnaire on dogs shows the questions to Lang. Her questionnaire includes: What is the dog's name?, Where did you get the dog?, What kind of dog is it?, What was one bad thing the dog has done?, What do you like best about your dog? Lang suggests that she try these questions out on several class members who have dogs to see what other ideas they might have.

B. Pinsky asks, "What trends are you seeing in the period you are studying?, What interests you about this period?, What is the message of the music?"

Pinsky moves to a student who has not selected a time period. "If you had a time machine like the one in "Back To The Future," what time would you like to visit?" The student answers, "The year 2050." Pinsky asks, "How might you predict the art, architecture, literature and music in 2050?" The student chooses to use science fiction as a basis for prediction of the art forms of that period.

Instruction

The instruction which the teacher provides includes the use of questions which create cognitive dissonance and discrepancy, pose contradictions and require the learner to consider other points of view.

A. The students involved in the locksmith shop have collected padlocks and improvised a safe. As Lang surveys their work, he asks what they have in the shop to secure a patio door. The students check back on the list they developed when they went to the locksmith shop and decided they had not asked that question.

The boys studying flags have begun to draw outlines of the continents but they are not satisfied with their work. Lang offers them the overhead projector and shows them how they can develop transparencies to trace.

The girl has refined her questionnaire and now is concerned about how she will be able to help her classmates distinguish among all the dogs she will be discussing in her report. Lang suggests she might draw pictures of each dog, but the student is not satisfied with that alternative. She would like to take a photograph of each dog. Lang offers to show her how to use the camera.

B. One student wants to view important works of art available in the school media center on the National Gallery of Art videodisc. Pinsky identifies a student who will help with this activity.

Students who were studying a variety of buildings were asked by Pinsky whether heights carried the same connotations in a 20th century metropolitan area as it did for the builders in the Middle Ages.

Evaluation

The teacher helps the learner to evaluate their own work and activity by eliciting the learner's comments on their work and the learning in which they are engaged. The samples of student work which are collected, in addition to the teacher's observations, provide a means for evaluating and assessing the student's learning and level of development.

Examples:

A. When the construction of the locksmith shop is complete, the students use the shop. Other classmates come to the shop to get new keys made, to get help in entering their locked car or file cabinet. The shopkeepers show a customer some ways to lock her patio door. Terms such as "tumblers," "double cylinder dead bolts," "key blanks," and "strike/frame reinforcer," are illustrated on wall posters. Flyers describe all the services the shop is prepared to provide. Lang asks how much of their field trip knowledge they have reproduced in this setting. One student remarks that they forgot to put up the logo that allowed customers to know that this shop had a registered locksmith. Other students detail how many of the features of the shop are similar to what they had seen. They point out how the keys can be sorted into different categories depending on which characteristic is considered salient.

The boys involved with flags are given an opportunity to show the results of their study. They give the class a report on flags of many countries as well as showing how their own country's flag has changed and evolved. The class responds to their report by asking questions. The boys gave each student a list of countries and a written description of each country's flag.

The girl who studied dogs was given time to show her pictures and reports on the dogs. She had numbered each picture and the class could focus on the picture as she shared the results of her interviews with the dog owners. Lang asks her if she had some interviews that went better than others. She replies that she found out it was better to call the owner first to ask for a convenient time to have the interview.

B. "Do favorable economic conditions encourage creativity?" Pinsky asks. "What is your theory?, What evidence supports your idea about the relationship of the creative arts and a period in time?" Pinsky asks the whole class to respond to the question, "Is there one art form that is an exception to the pattern of relationships you have described?"

Pinsky and one student meet to review the student's efforts. The student shares a collection of work samples. The process and the conclusions of the study are discussed with the teacher. The student states that it would have been better to use more non-print materials in the investigation.

Facilitating Closure

The teacher encourages each learner to select different types of learning experiences and provides time for group discussion of their experiences and what they have learned.

Examples:

A. When the locksmith shop is not being used too often, Lang draws this construction project to a conclusion by reading a story involving a boy apprentice. After the discussion, the students discuss how they would have felt if they had been apprenticed to the locksmith. They determine which parts of their shop should be saved and which should be discarded.

Lang asks if anyone can think of a way the boys could have provided a replica of each flag for the class. One child suggests they could have drawn the flags on ditto masters and let each child color his or her own. The boy who had wanted to classify the flags by color remarks: "It would be easier for the class to do if we had grouped the flags by color." Lang responds, "There is more than one way to proceed in solving a problem."

The project on "Dogs I Know" was displayed on the bulletin board. Lang encouraged students to bring pictures of their own dogs and information responding to the questions asked by the girl. The girl modeled the interview process for the class by questions of her classmates.

B. Pinsky asks: "Have you gained any insights in this study which help you to understand your own time and our art forms?, Could we have used another approach to study the relationships of literature, architecture and music?"

SUPPORT STRUCTURES

- Board and District Support
- Building Support

SUPPORT STRUCTURES

Quality instruction requires a multilevel support system. The following are some of the important support structures that must be in place for the teacher to be successful:

BOARD AND DISTRICT SUPPORT

The district management and appropriate committees identify and communicate the educational expectations for the K-12 program. Based on these expectations, the administrative staff develop and carry out plans to allocate the material, financial and human resources to promote student achievement of the educational expectations. The local school board approves a plan and allocates resources to promote the best use of district resources.

In a centralized management system, many decisions about resources, curriculum, staff development and policies are coordinated by one group. In a site-based management system, the central management group delegates greater decision making to professionals at the building level. The principal facilitates the formation of decision-making teams. A network of collegial relationships is formed and the professional and support staff at the building level is empowered.

BUILDING SUPPORT

Principal

The principal is an instructional leader in the school. He or she actively supports the curriculum and instructional processes through the management of human, material and financial resources. The principal communicates regularly with students, staff, parents and community members to evaluate and improve instruction. The principal seeks to involve teachers as advisors or shared decision makers about school policy issues which directly or indirectly affect instruction.

Building-level management facilitates and provides a climate for teachers and students where individuals are valued and appropriate resources of space, time, technology and personnel are provided. Cooperative teacher efforts can assess students' unique characteristics and develop instructional plans that reflect characteristics and educational expectations. Media and other specialists provide input on the planning process as well as support and resources to classroom teachers and students.

Instructional Teams

The principal encourages the collaboration of professional staff to make shared decisions in the planning, implementation and evaluation of instruction. Instructional teams also plan for a variety of organizational patterns within and across grade levels and departments to maximize instructional opportunities for learners and fully use the strengths of professional and support staff.

Professionals in Student Services

Professional staff are also organized to review profiles of individual students who are recommended for more intensive evaluation. Student service professionals contribute to the team through their knowledge of individuals. They focus the team on the whole child by contributing information about the physical, psychological and sociological aspects. Instructional plans are then designed to meet the needs of the learner. Student services support the instructional process by helping all students cope with the common stresses of growth and development and by helping individual students cope with unique stresses.

The professional staff involved in student services represent the disciplines of counseling, nursing, psychology and social work.

Student services encompasses five areas:

1. Identification of problems or issues affecting individuals, groups or the entire school community.

2. Prevention of problems which could affect individuals, groups or the entire school community.

3. Evaluation and assessment of student performance, health problems, family structure and function, career guidance, and interpretation of observations, recommendations or test results to students, parents and teachers.

4. Planned interventions to the student or family is made directly by the student services professional or indirectly by assistance to the classroom teacher or the district or building administrator.

5. Crisis intervention.

SUMMARY

SUMMARY

The processes of teacher-designed instruction are: assessment, planning, implementation and evaluation. Models of teaching describe the teacher's actions during the implementation phase of instruction and the student's responses to the instruction.

Each model is appropriate for particular settings, times and conditions. Together they represent a range of alternatives open to teachers in facilitating learning events. The models help to create a vision about the flow of instruction occurring within a series of instructional events planned by the teacher.

Although there are many components of the instructional process, a major influence on both cognitive and affective growth of the learner is the teacher. The teacher's attitudes, beliefs and actions directly affect the success of each individual learner. As stated earlier, an understanding of the instructional process provides teachers with opportunities to be both artful and scientific about the teaching act.

APPENDIX

TEACHER ROLES

	DIRECTIVE MODEL	INVESTIGATIVE MODEL	INTERACTIVE MODEL
	Teacher determines objectives/outcomes	*Teacher/Learner determine objectives/outcomes*	*Teacher/Learner determine outcomes*
	THE TEACHER:		
Introduces	Involves student in activities which focus on the intended objective	Involves student in activities which focus on concepts to be addressed	Designs a learning environment which facilitates student decision making
	Creates a motivational environment for the student	Creates a motivational environment for the student	Creates a motivational environment for the student
Interacts Communicates			Observes selections of students and challenges and encourages student involvement with physical environment and peers
Instructs	Comunicates objectives	Communicates broad objective or concept	
	Provides information and relevant activities, asks questions, responds to learning efforts of students	Provides exploratory activities and poses questions or problems which facilitate students in selecting a process for determining and achieving the objective	Uses questions and discussion to enable students to consider different points of view, ideas, conclusions and create opportunities for students to share with each other. Encourages prediction and self-correction and challenges "stretch" thinking
	Demonstrates process or product to be learned and identifies what makes it correct	Demonstrates process or product to be learned	

	DIRECTIVE MODEL *Teacher determines objectives/outcomes*	INVESTIGATIVE MODEL *Teacher/Learner determine objectives/outcomes*	INTERACTIVE MODEL *Teacher/Learner determine outcomes*
Provides Choices		Designs activities which involve students in defining the parameters of broad based objectives	Guides students in examing their choices
Practice	Designs opportunities for students to repeat the product or process in the teacher's presence Designs repetition of process or product which can be done without the teacher's presence		
Monitors	Designs activities which will allow formal and informal diagnosis of student achievement and act on the diagnosis by reteaching, continuing instruction, quitting or extending or changing the objective (the teacher may move to a different model)	Observes and guides independent activites. The observation may lead to coaching, teaching and procedure or thought process to enhance success	
Closure	Elicits student responses that summarize or critique intended objective and encourages transfer of theme, issue or problem	Elicits responses which allow student to describe the stages of their work and encourage transfer to another learning episode or life experience	Encourages student reflection on learning experiences, assists in carrying out student projects
Evaluation	Elicits formal or informatal student responses which demonstrate student achievement of intended objective	Identifies cues regarding student growth and interests to be incorporated into ongoing instructional planning	Elicits self evaluation from students and provides feedback

References for Directive Model

Bloom, Benjamin S. **Taxonomy of Educational Objectives: the Classification of Educational Goals, vol. 1, Cognitive Domain**. New York: David McKay Co., 1956.

Borko, Harold et al. "Teachers' Decision Making." **Research on Teaching: Concepts, Findings and Implications.** Edited by Penelope L. Peterson and Herbert J. Walberg. Berkeley, CA: McCutchan Pub. Corp., 1979.

Brophy, Jere E. "Research Using Observation to Improve Your Teaching." **Childhood Education** vol. 55, #5 (Apr-May 1979): 313-17.

Brophy, Jere E. "Teacher Behavior and its Effects." **Journal of Educational Psychology** vol. 71, #6 (Dec 1979): 733-50.

Brophy, Jere E. "Teacher Behavior and Student Learning." **Educational Leadership** vol. 37, #1 (Oct 1979): 33-38.

Brophy, Jere E. "Relationships Between Teacher's Presentation of Classroom Tasks and Students' Engagement in Those Tasks." **Journal of Educational Psychology** vol. 75, #4 (Aug 1983): 544-552.

Doyle, W. "Effective Secondary Classroom Practices." **Reaching For Excellence: An Effective School's Sourcebook.** Edited by Regina M. J. Kyle. Washington D.C.: Government Printing Office, 1935.

Good, Thomas L., Biddle, Bruce J. and Brophy, Jere E. **Teachers Make a Difference.** New York: Holt, Reinhart and Winston, 1975.

Good, Thomas L. and Brophy, Jere E. **Looking In Classrooms.** 3d ed. New York: Harper and Row, 1984.

Hunter, Madeline. **Teach More-Faster: A Programmed Book.** El Segundo, CA: TIP Publications, 1967.

Hunter, Madeline. **Improved Instruction**. El Segundo, CA: TIP Publications, 1976.

Hunter, Madeline. "Teacher Competency: Problem, Theory and Practice." **Theory Into Practice** vol. 15, #2 (1976): 162-71.

Hunter, Madeline. "Diagnostic Teaching." **The Elementary School Journal** vol. 80, #1 (Sept 1979): 41-46.
Hunter, Madeline. "Teacher is Decision Making." **Educational Leadership** vol. 37, #1 (Oct 1979): 62-64, 67.

Hunter, Madeline. **Increasing Your Teaching Effectiveness.** Palo Alto, CA: Pitman Learning, 1981.

Rosenshine, Barak V. "Recent Research on Teaching Behaviors and Student Achievement." **Journal of Teacher Education** vol. 27, #1 (1976): 61-64.

Rosenshine, Barak V. **Academic Engaged Time, Content Covered and Direct Instruction.** ED152-776 (1978).

Stallings, Jane. **Effective Use of Classroom Time**, Appalachia Educational Laboratory, Charleston, WV: (ERIC Document Reproduction Service No. ED 252-515, Vanderbilt University).

Stallings, Jane. "A Study of Implementation of Madeline Hunter's Model and its Effect on Students." **Journal of Educational Research** vol. 78, #6 (July-Aug 1985): 325-37.

Stallings, Jane, et al. **Under What Conditions Do Children Thrive in the Madeline Hunter Model?** A report of Project Follow Through, Napa, CA: (ERIC Document Reproduction Service No. ED265-141).

References for Investigative Model

Biehler, Robert F. **Psychology Applied to Teaching.** 2d ed. Boston: Houghton Mifflin, 1974.

Brophy, Jere E. "Synthesis of Research on Strategies for Motivating Students to Learn." **Educational Leadership** vol. 45, #2 (Oct 1987): 40-48.

Bruner, Corno, Lyn and Mandinach, Ellen B. "The Role of Cognitive Engagement in Classroom Learning and Motivation." **Educational Psychologist** (1983): 88-108.

Corno, Lyn and Snow, Richard E. "Adaptive Teaching to Individual Differences Among Learners." **In Research on Effective Teaching** (1986): 605-629.

Entwistle, Noel. **Styles of Learning and Teaching: An Integrated Outline of Educational Psychology for Students, Teachers and Lecturers.** New York: John Wiley and Sons, 1981.

Gardner, Howard. **Frames of Mind: The Theory of Multiple Intelligences**. New York: Basic Books, Inc., 1983.

Johnson David W. and Johnson Roger T. **Learning Together and Alone: Cooperative, Competitive, and Individualistic Learning**. Englewood Cliffs, New Jersey: Prentice Hall, 1987.

Jones, Beau Fly...et.al. **Strategic Teaching and Learning: Cognitive Instruction in the Content Areas**. Alexandria, VA: Association for Supervision and Curriculum Development (in cooperation with the North Central Regional Educational Laboratory), 1987.

Joyce, Bruce and Marsha Weil. **Models of Teaching**. Englewood Cliffs, New Jersey: Prentice Hall, Inc., 1986.

Keller, John M. "Motivational Design of Instruction." **Instructional-Design Theories and Models.** Hillsdale: New Jersey: Lawrence Erlabaum Associates. (1983): 386-434.

Maker C. June. **Teaching Models in Education of the Gifted.** Rockville, MD: Aspen Systems Corp., 1982.

Renzulli, Joseph S. (Ed.) **Systems and Models for Developing Programs for the Gifted and Talented**. Mansfield Center, Connecticut: Creative Learning Press, Inc., 1986.

Sharan, Shlomo. "Cooperative Learning in Small Groups: Recent Methods and Effects on Achievement, Attitudes, and Ethnic Relations." **Review of Educational Research**. (1980): 241-271.

Slavin, Robert E. "Cooperative Learning." **Review of Educational Research**. (1980): 315-342.

Squires, David A., William G. Huitt, and John K. Segars. **Effective Schools and Classrooms: A Research-Based Perspective**. Alexandria, Virginia: Association for Supervision and Curriculum Development, 1983.

Sternberg, Robert J. (Ed.) **Mechanisms of Cognitive Development**. New York: W. H. Freeman and Co., 1984.

Strother, Deborah Burnett. "Adapting Instruction to Individual Needs: An Eclectic Approach." **Phi delta Kappan** (December, 1983). 308-311.

Thelen, Herbert A. **Education and the Human Quest**. New York: Harper and Brothers, 1960.

Thelen, Herbert A. **The Classroom Society: The Construction of Educational Experience**. New York: John Wiley and Sons, 1981.

References for the Interactive Model

Bell-Gredler, Margaret. **Learning and Instruction: Theory into Practice**. New York: Macmillan, 1986.

Biggs, John. and Kevin Collis. **Evaluating the Quality of Learning: The SOLO Taxonomy**. New York: Academic Press, 1982.

DeVries, Rheta. and Lawrence Kohlberg. **Programs of Early Education: The Constructivist View**. New York: Longman.

Edwards, Carolyn Pope. and Patricia G. Ramsey. **Promoting Social and Moral Development in Young Children: Creative Approaches for the Classroom**. New York: Teachers College Press, 1986.

Jacobs, Saied H. **Foundations for Piagetian Education**. New York: University of America Press, 1984.

Kamii, Constance. and Rheta DeVries. **Physical Knowledge in Preschool Education: Implications of Piaget's Theory**. Engelwood Cliffs, New Jersey: Prentice Hall, 1978.

Piaget, Jean. **To Understand is to Invent**. New York: Grossman, 1973.

Sigel, Irving E. and Ruth Saunders. "An Inquiry into Inquiry: Question Asking as an Instructional Model." **Current Topics in Early Childhood Education**, vol.2 Norwood, New Jersey: Ablex (1984):169-193.

This publication was edited and produced by Cynthia Hanson, Curriculum Editor, and desktop published by Deborah Pope, Minnesota Department of Education.